

# **BONE DENSITY DETERMINATION FOR THE MAXILLA AND THE MANDIBLE IN DIFFERENT AGE GROUPS BY USING COMPUTERIZED TOMOGRAPHY**

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# Abstract

Mini implant stability is primarily related to local bone density; no studies have evaluated bone density related to mini-implant placement for orthodontic anchorage between different age groups in the maxilla, mandible and paramedian palatal area.

The present research aims to evaluate age, gender, side and regional differences in the bone density at various orthodontic implant sites (maxilla and mandible, alveolar and basal, cortical and cancellous, buccal and palatal/lingual and anterior and posterior).

Fifty three individuals were divided into two groups according to their age into: group I (10 males and 11 females, ages 16-20 years) and group II (17 males and 15 females, ages 21-29 years) had subjected to clinical examination, then 64-multislice computed tomography scan data were evaluated and bone density was measured in Hounsfield unit at 178 points (85 in the maxilla, 85 in the mandible and 8 in the palate), and mean bone density was calculated at each site in the axial, sagittal and coronal planes.

The results that were obtained showed that there is a difference in bone density at different ages and sites. No significant differences in bone density between the left and right sides and the gender were found. In the maxilla, bone at the canine and the premolars regions had the highest bone density and the maxillary tuberosity was the area with the lowest bone density.

The mean bone density of the cortical bone was greater in the mandible than in the maxilla and showed a progressive increase from the anterior to the posterior area. Differences between the maxillary buccal and the lingual bones were significantly high; while the differences in the density between the mandibular buccal and lingual bone sides were generally not significant except that in group I where the lingual side had significantly higher bone density at almost all the points; while in group II the difference was observed posteriorly.

Cortical bone densities in the basal bone in both the maxilla and the mandible were significantly higher than the alveolar bone in both groups; while the cancellous bone differences were generally not significant.

Moreover, the paramedian palatal cortical bone anteriorly distal to the canine was significantly denser than bone located more posteriorly distal to the first molar and the density of the cancellous bone was not statistically significant. Finally the bone density at palatal paramedian cortical bone was higher than of the alveolar cortical bone and was not significantly different to that of the basal bone distal to the canine in the maxilla; while the palatal paramedian cortical bone was similar to that of the maxillary alveolar bone and significantly lower when compared to the maxillary basal bone at the first molar point.

These differences in bone density between and within age and between and within regions of the jaws must be considered when placing mini implants and may provide valuable information when selecting sites, size, angle and placement methods for mini implant in the dental arch.